MXL-INST-PULSE
Rev 4
04/2021

MX Series
Pulser Options

INSTRUCTION MANUAL

Standard Pulse Cap fitted to meter

Industrial Pulse Cap fitted to meter

DIN Pulse Cap fitted to meter

To the Owner

This manual contains connection and operating instructions for a selection of Pulse output options.

Please read and retain this instruction manual to assist you in the operation and maintenance of these products.

In addition Macnaught offer a comprehensive set of online support materials to compliment this instruction manual. You can access the website by scanning the QR code or visiting the Macnaught website www.macnaughtflowmeasurement.com.au

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Types of Switches

Note !

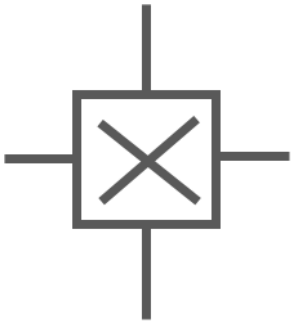
Reed Switch: Reed Switch is a 2-wire device which triggers by magnet inside the rotors as they spin. To maximise the life of the reed switch, the pulse board comes equipped with a 1k8Ω current limiting resistor in series.

Reed Switch

Note !

Hall Effect Switch: Hall Effect switch is a 3-wire device which triggers by south pole of the magnet inside the rotors as they spin. This switch is NPN type. The switch circuit is equipped with a 4k7Ω pull -up resistor between signal and supply.

Hall Effect Switch



Technical Specifications for Reed & Hall Switches

Output Signals	Standard Pulse Meter		2 x Digital (Square Wave)
Reed Switch (Mechanical Sensor)	Current	Maximum	500mA
	Voltage	Maximum	30V DC
	Contact Rating	Maximum[1]	10W
Hall Effect Switch (Electronic Sensor)	Maximum Supply Current		7.5mA
	Maximum Output Current		25mA
	Operating Voltage		4.5V to 24V DC
	Output Type		Open-Collector NPN

1. Contact rating maximum is 10W. Neither current nor voltage maximums should be exceeded in achieving this.

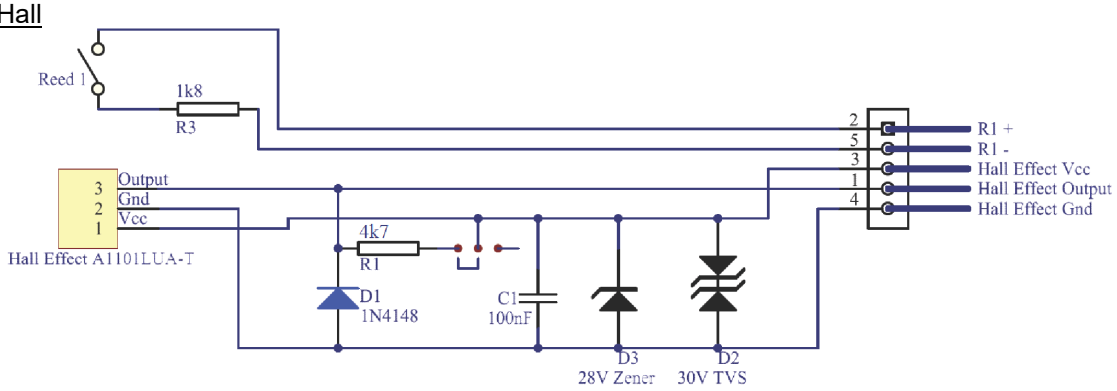
Available Configurations for Standard, Industrial and DIN Pulse Caps

The Below 3 configurations are available with Standard, Industrial and DIN pulse caps

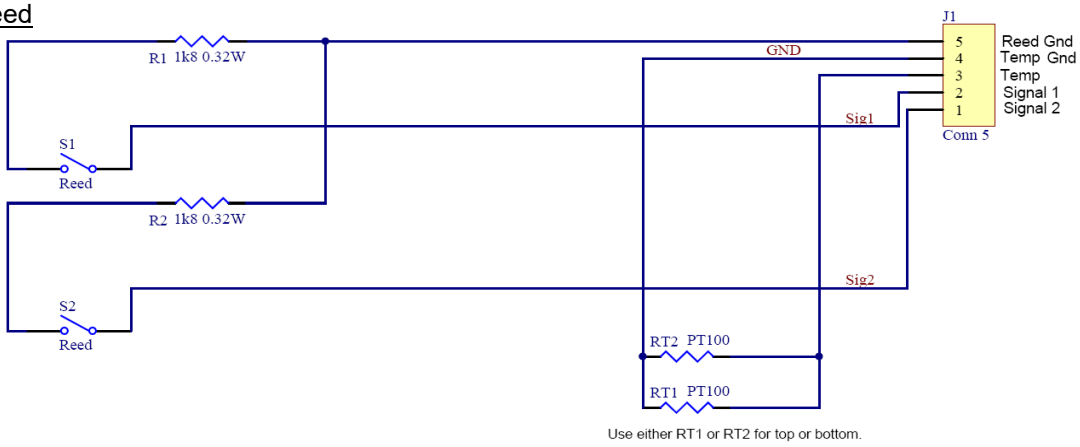
- **Configuration 1 Reed and Hall Effect Sensors**
- **Configuration 2 Dual Hall Effect Sensors**
- **Configuration 3 Dual reed switches**

Circuit Diagrams for Available Configurations

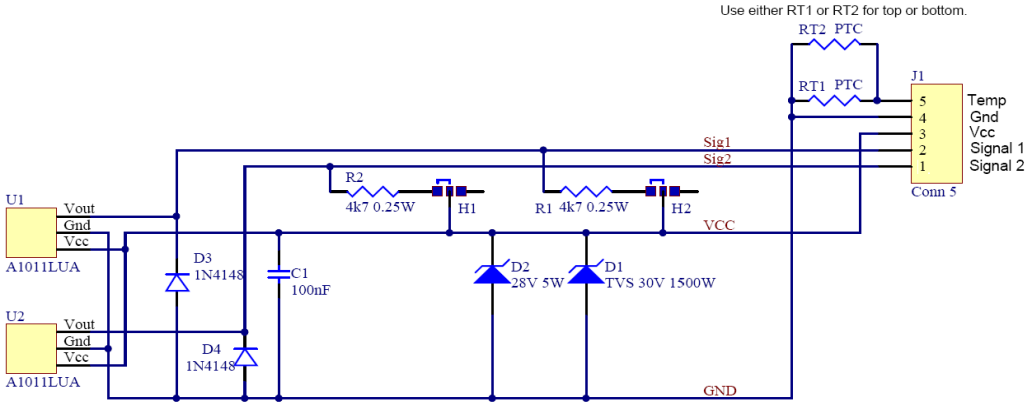
Reed/ Hall



Reed/ Reed



Hall/ Hall

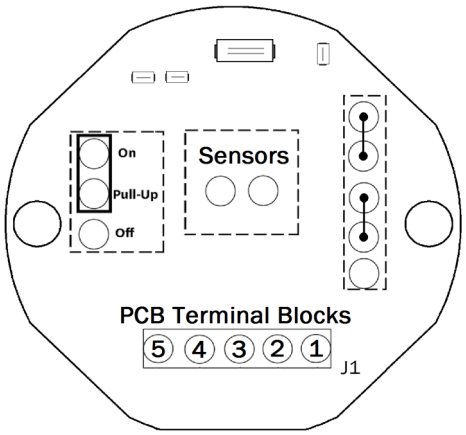


Standard Pulse Cap

Standard Pulse Cap incorporates the M-LOCK (1/4" turn) mounting system. The housing is made up of polypropylene with PCB fitted inside.

Standard Pulse Cap

PCB



Terminal	Wire colour	MXD-A (Reed/ Hall)		MXD-I (Reed/ Reed)	
1	White	Hall	⎍⎍⎍	Reed 2	⎍⎍⎍
2	Yellow	Reed	⎍⎍⎍	Reed 1	⎍⎍⎍
3	Red	Hall	+	N/C	
4	Black	Hall	⏚	N/C	
5	Green	Reed	-	Reed 1 and 2	-

Terminal	Wire colour	MXD-J * (Hall/ Hall)		MXD-K ** (Double pulse)	
1	White	Hall 2	⎍⎍⎍	Hall	⎍⎍⎍
2	Yellow	Hall 1	⎍⎍⎍	N/C	
3	Red	Hall 1 and 2	+	Hall	+
4	Black	Hall 1 and 2	⏚	Hall	⏚
5	Green	N/C		N/C	

Legends:

Reed:	Reed Switch	⏚	Ground
Hall:	Hall Effect sensor	N/C:	No connection
-	Reed Switch common	Local display is connected to Reed1	
⎍⎍⎍	Signal output	Terminal 1 is the right most terminal	
+	Power supply for Hall		

Note !

- *Standard Pulse Cap Temperature (*-40 °C -120 °C*)*
- *IP 67*

Standard Pulse Cap Output types A, I, J, K

Ordering Code					
	MXD	MX Series Cap			
		-	Separator		
			A		1 x reed and 1 x Hall Effect Sensors
			I		2 x Reed Sensors
			J		2 x Hall Effect Sensors
			K		High Resolution Sensor
				S	Sub-Assembly kit
Example	MXD	-	A	S	
Example	MXD	-	J	S	

Standard Pulse Cap Part Numbers	
MXD-AS	MXD-JS
MXD-IS	MXD-KS

Note !

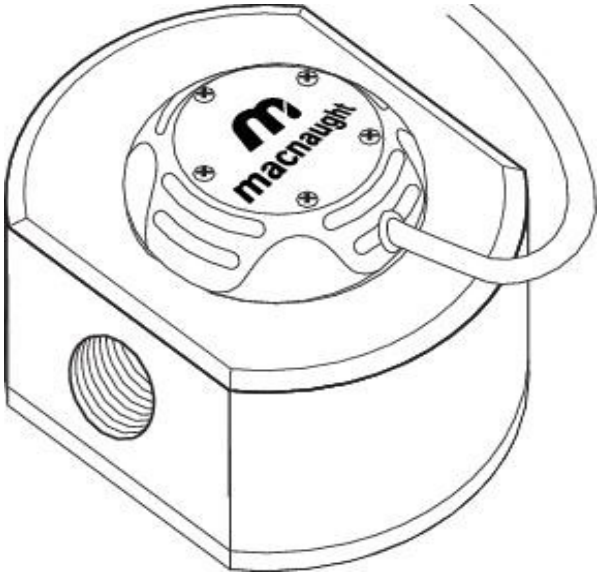
* *MXD-JS generate Quadrature Pulse Output*

Note !

** *MXD-KS has one hall effect high resolution sensor.*

Illustration

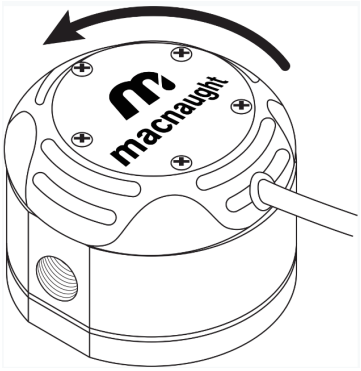
Standard Pulse Cap fitted to 1” meter



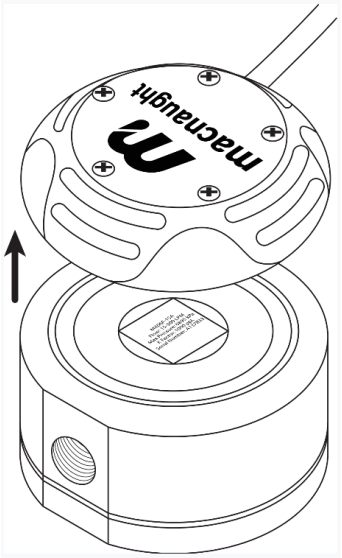
Assembly/Disassembly

1. Rotate the pulse cap 90° anticlockwise to disassemble
2. Pull the cap away from body

1



2



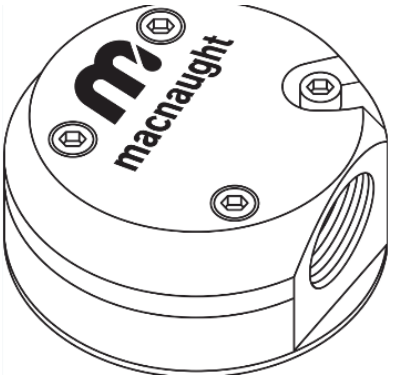
Place pulse cap onto the body and rotate 90° clockwise to reassemble

No Tool required to assemble/dissemble

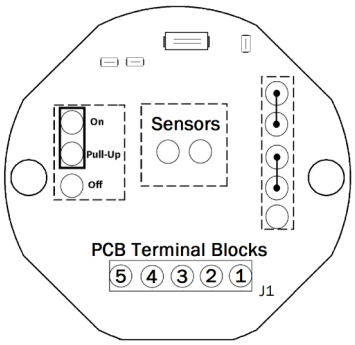
Industrial Pulse Cap

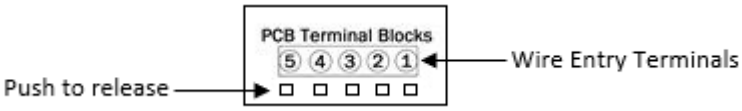
Industrial Pulse Cap is fixed to the flow meter and does not incorporate M-lock feature. It comes with Conduit Entry to facilitate customers for own wiring.

Illustration



PCB





Terminal	MXD-xCx-RH (or Reed/ Hall PCB)	
1	Hall	⎍⎍⎍
2	Reed	⎍⎍⎍
3	Hall	+
4	Hall	⏚
5	Reed	-

Terminal	MXD-xCx-RR (or Reed/ Reed PCB)	
1	Reed 2	⎍⎍⎍
2	Reed 1	⎍⎍⎍
3	N/C	
4	N/C	
5	Reed 1 and 2	-

Terminal	MXD-xCx-HH * (or Hall/ Hall PCB)	
1	Hall 2	⎍⎍⎍
2	Hall 1	⎍⎍⎍
3	Hall 1 and 2	+
4	Hall 1 and 2	⏚
5	N/C	

Legends:

Reed:	Reed Switch
Hall:	Hall Effect sensor
-	Reed Switch common
⎍⎍⎍	Signal output
+	Power supply for Hall
⏚	Ground
N/C:	No connection

Terminal 1 is the right most terminal

Note ! * *MXD-xCx-HH generate Quadrature Pulse Output*

Note ! - *Industrial Pulse Cap Temperature (*-25 °C -120 °C*)*
- *IP 67*

Cable Specifications for Standard/Industrial Pulse Cap

Minimal cable specification recommended for wire:

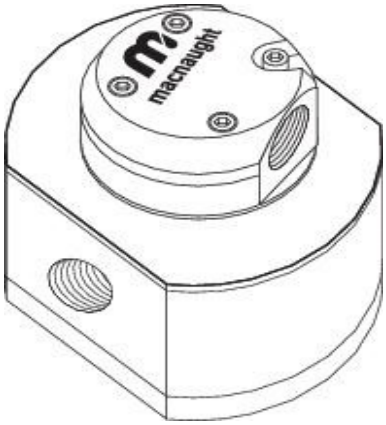
- 5 core, 24 AWG each
- drain wire AND shielding/ copper braiding
- Temperature rating: -20 - 80 °C
- Voltage rating: 300 V

- Maximum cable length should not exceed 60 metres.

- If cable is extended and/or longer than 10m, it is highly recommended to use 24V power supply for Hall Switch and reed switch.

Illustration

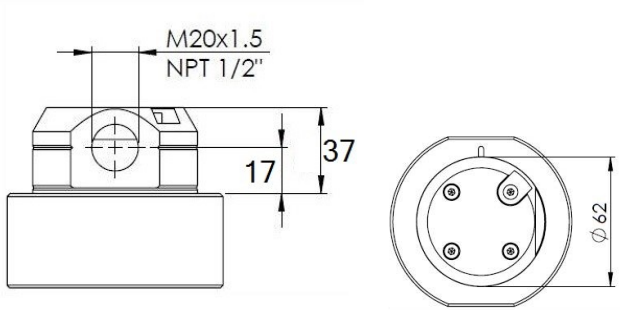
Industrial Pulse Cap fitted to 1” meter

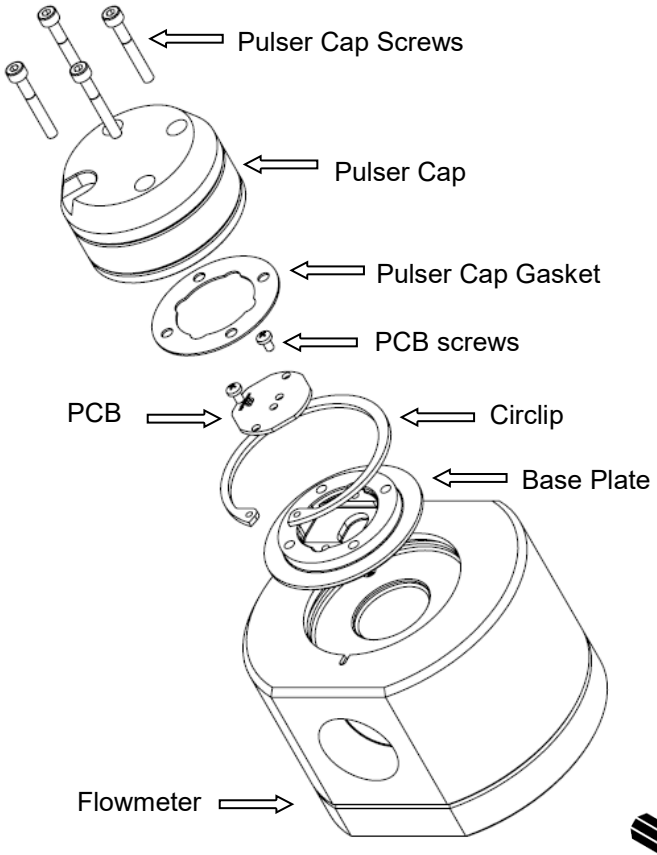


Ordering Code							
	MXD	MX Series Cap					
		-	Separator				
			A*	Housing Material: Aluminum 6061			
			S *	Housing Material: SS 316			
				CM	Conduit size: M20 X 1.5 (Gland Entry)		
				CN	Conduit size: 1/2" NPT (Gland Entry)		
					-	Separator	
						RH	1 x reed and 1 x Hall Effect Sensors
						RR	2 x Reed Sensors
						HH	2 x Hall Effect Sensors
Example	MXD	-	S	CM	-	RH	
Example	MXD	-	A	CM	-	RR	

* Industrial Pulse Cap Housing material “Aluminium” to be fitted to flow meter having Aluminium Body
* Industrial Pulse Cap Housing material “SS 316” to be fitted to flow meter having SS 316 Body

Industrial Pulse Cap Part Numbers	
MXD-ACM-RH	MXD-SCM-RH
MXD-ACM-RR	MXD-SCM-RR
MXD-ACM-HH	MXD-SCM-HH
MXD-ACN-RH	MXD-SCN-RH
MXD-ACN-RR	MXD-SCN-RR
MXD-ACN-HH	MXD-SCN-HH





The Industrial Pulse Cap comprises of 3 major components.

1. Industrial Pulse Cap
2. PCB (sensor board)
3. Secure Base Plate

In order to access the PCB, or for the removal/ replacement of the complete Pulser Module, the Following procedure applies.

Disassembly/Reassembly

- Remove the 4 socket head cap screws holding the Industrial Pulse Cap to the Base Plate. Take care not to lose the gasket.
- Lift the Pulse Cap to expose the terminal block for the connection/disconnection of the signal cables.
- The PCB can be removed by loosening the two screws securing it to the Base Plate.
  Note: It is not necessary to remove the PCB if the objective is to remove the complete base plate (see next step)
- To separate the Base Plate from the Flow meter body, remove the stainless steel Cir-clip.

Note ! Reassemble by reversing the above sequence.

DIN Pulse Cap

DIN Pulse Module incorporates the M-LOCK (¼ turn) mounting system. It provides a locking facility for added security against unauthorised removal. A locking screw is supplied with DIN pulse cap to accomplish the job by fitting module to the flow meter using M-lock feature and replacing the existing screw with locking screw.

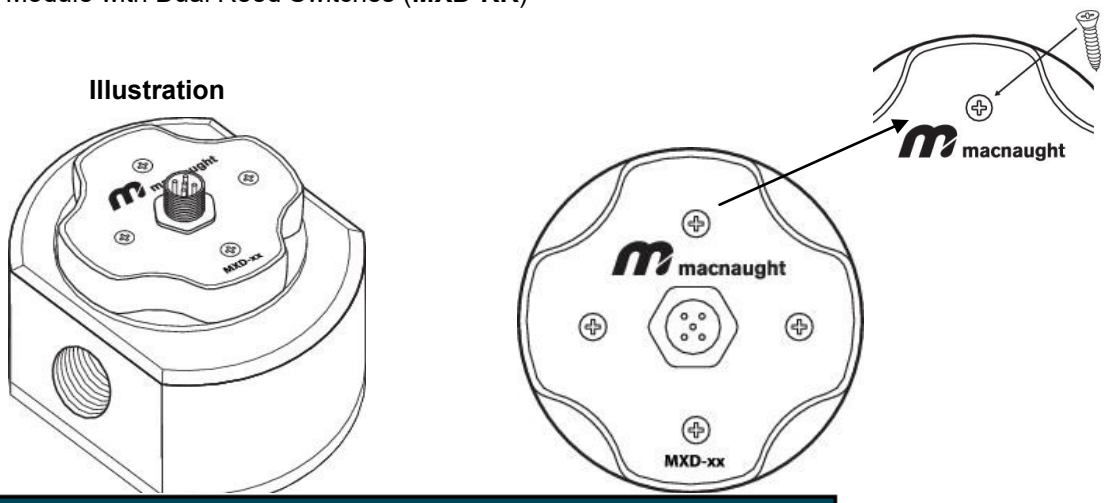
Note !

During initial installation of the locking screw, the screw **will need to pierce** the bottom of the pulser. This will enable the screw to 'lock' into the plastic cam that is fixed to the flow meter.

The available options are:

- DIN Module with 1 x Reed and 1 x Hall effect sensor (**MXD-RH**)
- DIN Module with Dual Hall Effect sensors (**MXD-HH**)
- DIN Module with Dual Reed Switches (**MXD-RR**)

Illustration



Ordering Code				
	MXD	MX Series Cap		
		-	Separator	
			RH	1 x reed and 1 x Hall Effect Sensors
			RR	2 x Reed Sensors
			HH	2 x Hall Effect Sensors
Example	MXD	-	RH	
Example	MXD	-	HH	

DIN Connector Pulse Module Part Numbers
MXD-RH
MXD-RR
MXD-HH

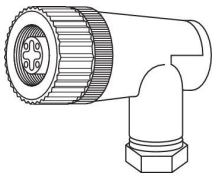
The DIN Pulse Modules accommodates the choice of either a field mountable connector facility, or a fixed (M12) connection cable.

- M12 DIN plug and socket complete with 5 core cable.
- Field attachable socket with 5 position screw terminals

M12 DIN cable

Cable Length	Part Number
1.5 Meters	**MXD-C1.5**
5 Meters	**MXD-C5**
10 Meters	**MXD-C10**

Field attachable socket/connector

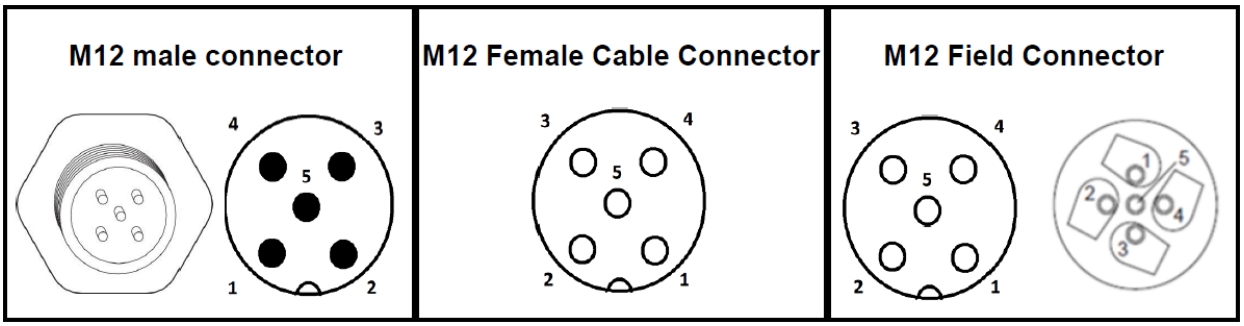


Part number: **MXD-CF**

DIN Pulse Module Output Type (MXD-xx)

Note !

- *DIN Pulse Cap Temperature (-25 °C -120 °C)*
- *IP 67*



	Cable Colour	Reed / Hall Module	Dual Reed Module	Dual Hall Module
1	Brown	HE Supply (VCC)	N/A	HE Supply (VCC)
2	White	HE Signal (V out)	Reed Signal 1	HE Signal 1 (V out)
3	Blue	HE Ground	Reed Ground 1	HE Ground
4	Black	Reed (Signal)	Reed Signal 2	HE Signal 2 (V out)
5	Green-Yellow	Reed (Ground)	Reed Ground 2	N/A

M12 DIN Female Cable Connector

General	
Connector	M12 (right angle)
Standards / regulations	IEC 61076-2-101
Technical Specifications (Plug and socket)	
Number of positions	5
Protection	IP67
Material of body	TPU (thermoplastic polyurethane)
Rated voltage / current	60v / 4A
Contact resistance	Max 5 mΩ
Ambient temperature (plug and socket)	-25°C - 90°C
Technical Specifications (cable)	
Core Number	5 core
Core colours	brown, white, blue, black, green-yellow
Cable material	PUR (polyurethane)
Conductor cross section	5 x 0.34mm² (signal lines)
Rated voltage / current	60v / 4A
Ambient Temperature (operation)	-25°C - 80°C (cable, fixed installation)
Cable resistant to	acids, alkaline solutions and salt water

M12 Field Connector

General	
Connector	M12
Standards / regulations	IEC 61076-2-101
Technical Specifications	
Number of positions	5
Protection	IP67
Conductor cross section	0.25mm² - 0.75mm²
Material of body	PTB
Sealing material	NBR (nitrile rubber)
Ambient temperature	-25°C - 85°C (plug and socket)
Rated voltage / current	60v / 4A

NOTES

WEEE Directive - Waste Electrical and Electronic Equipment

The WEEE Directive requires the recycling of waste electrical and electronic equipment in the European Union.

Whilst the WEEE Directive does not apply to some of Macnaught's products, we support its policy and ask you to be aware of how to dispose of this product.

The crossed out wheelie bin symbol illustrated and found on our products signifies that this product should not be disposed of in general waste or landfill.

Please contact your local dealer national distributor or Macnaught Technical Services for information on product disposal.

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